THE AMERICAN
JOURNAL OF PSYCHOLOGY
Founded by G. Stanley Hall in 1887

Vol. XXV APRIL 1914 No. 2

A SYNTHETIC GENETIC STUDY OF FEAR*

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CHAPTER I

Fear is the anticipation of pain. For those forms of life capable of fear this anticipation is not prevision but only a highly generalized fore-feeling, itself unpleasant, that a yet more painful state impends. The will to live, the *élan vital,* is more or less checked in its momentum or narrowed in its range by some kind of intimation that it may be still further held up. This protensive or futuristic attitude or orientation toward a pejoristic state is the specific *quale* of the psychic condition called fear. Psychogenetically it is a primitive *Anlage* of futurity and it is the most stimulating and vivid of all its forms of presentation. In fear the future dominates the present and gives it a new significance in addition to its own, and but for fear pain could do little of its prodigious educative work in the animal world. Fear is thus the chief paradigm of psychic prolepsis as well as the chief spur of psychic evolution. The *Einstellung* it motivates to the "what next" and the "about to be" may become, second only to present pain, the most intense of all psychic experiences. This power to fore-feel pain, although not unanalyzable genetically, is nevertheless primary, unitary and unique enough to be considered practically, if not scientifically, as indeed it always has been popularly, as a prime category of the emotional or

* I have called this study synthetic because in it I have tried to correlate all the chief lines of study of fear, normal and morbid, in children and adults, men and animals. As the synthetic principle I have found geneticism of chief value.

affective life. In its most generic form it is identical in all stages of animal life, for the function of pain-anticipation is common to and underlies all its innumerable differentiations as to objects, its degrees, physiological concomitants and modes of expression.

Fear has only one genetic presupposition and that is some experience, individual or racial, up and down the algedonic scale. There must have been suffering and this must have left some trace. Here, then, we have germs of both memory and recollection, however rudimentary and unconscious. From this point of view we may further define fear as revived traces or engrams of past pains in prospect of passing over into re-realization which latter is normally more intense than its merely reproduced forms. If pain had not been felt it could not be anticipated, hence the condition precedent of fear is some kind of registration (whether transmissible by heredity from forbears or individually acquired we shall discuss later) and some degree of revival of these vestiges. Thus fear involves the past as we have seen it does the future. Without conservation of past experiences there could be no fear, nor could there be if the phosphorescence of the traces left by the past were more painful than their dreaded reinstatement itself, which latter case indeed occurs, but only in certain psychalgias in which the pain of the present moment is so excruciating that any presentiment of a greater one is impossible. In a general sense, then, and subject to many specific limitations, we may say that both the intensity and variety of fear depend on the intensity and variety of the pains that have before been felt. Too much suffering tends to timidity, too little exposes to avoidable dangers without either warnings or defenses, and the optimum between these extremes, which varies greatly with individuals, will some day be an attainable and perhaps individually prescribed goal of orthogenesis as it already is of psychotherapy. Not only are herbivora and all creatures being preyed upon timid and carnivora relatively fearless, but many phobias are the direct result of shocks and we may say in general that the first fear in the world could only come after a preceding pain.

As to the relation of fear to the third division of time, the present is never so full of content as at the moment of acute fear. The latter is differentiated sharply from all other times and crammed with psychic activities. All resources are rung up and focused on the now as well as on the here. There is often a unique sense of "it has come" common to other intense, summative experiences. The present seems to swell,

stretch, suck up the past and future into itself. Time is bunched, as it were, in a block. We are never so conscious of fractions of a second and they are never so fateful, although we are perhaps never less conscious of abstract, homogeneous time. The soul is perhaps never so vital, awake, so penetrated with the sense of its own existence as well as of its own worth, so desirous of conserving itself, and at the same time it is never more filled with a sense of the reality of the environment. Hence it is never so active and potentialized on the one hand and never so passive and saturated with a feeling of its dependence on the other. All forms of animal life have experienced it, yet it is so intense and absorbing that much self-observation is impossible, introspection knows it not, and the characterizations of it by psychologists show little conception of its nature or importance, but usually consist of a few hackneyed phrases indicating how it feels to be afraid, a description of a few of its physical expressions and the assignment to it of a place in some abstract classificatory scheme. In fact every philosophical category discussed from Aristotle to Hegel and every psychological function are implicit in the simplest state of urgent fear, and it may stimulate or check about every physiological function.

Thus if Bergson's *durée réelle* or pure duration or time freed from spatialization which the intellect always tends to give it, has any existence, it is in the pure psychic state of fear. If pleasure-pain is the result of the first day's work of creative psychic evolution, fear is that of the second. Above the scope of all parallelistic and interaction theories and long before the development of the wide domain where the Lange-James theory applies, we must thus posit a fear state which, when it had once broken through, became an independent existence with a promise and potency of its own as truly as did the vertebrate plan of life when it arose. At bottom and in its most generalized form it is elemental, at least beyond the reach of present psychological analysis. It has great explanatory power but at root is itself inexplicable by any or all of its phenomena. Nothing save pleasure and pain has such invincible psychological reality. No purely psychic factor has such dominance over the body or over health and disease. If we assume a pain state in the lowest organisms which would bring katabolism and dissolution and that this process might pass on to death with no counter tendency to check or to rejuvenate it, such elemental vital units might pass on to extinction and feel no fear. But no such creatures are known to exist for fear has its biological basis as deep as

immunization, regeneration of lost parts and recuperative processes generally, including those of resistance of fatigue. We do not then need to assume that the fear state actually exists in isolation from its usual bodily concomitants, *i. e.*, without affecting function or passing over to the motor zones of which it is one of the great organizers, although as we shall see, there are other pathological states that seem to approach this isolation in the receptive stages. The pure fear state then is not unlike a very active but widely diffused chemical element which profoundly modifies animate and inanimate nature, but which, because of its many and intense affinities, we have never yet been able to completely isolate though we may go on indefinitely learning more about it. Philosophers have long ascribed to the pure intellect and poets to love an existence so independent that they could survive the body. But there is probably nothing psychic of which we have so much reason to make any such postulate, were we so disposed, as we are not, as we have concerning the pain state, for no psychic activity has such power to control the soma in all its developmental stages and in all its functions. Hence if there be a vital principle fear must be one of its very close allies as one of the chief springs of mind. Thus if any psychic component is not a mere epiphenomenon, but has an entity of its own, it is this.

In fact fear is intensely *dynamogenic* and also *inhibitive*. The prospect of actual pain puts to life the question of its very survival or extinction, complete or partial. Something bad has begun that is prelusive of something worse, but this worse must if possible be avoided. So feeling must pass over into doing. The narrowing of the pleasure field, or its conversion into its opposite, makes the strongest of all appeals to the efferent tracts to energize to their uttermost. Much conduct, behavior, many habits and even motility itself throughout the animal world might be described as more or less organized pain-fugues which are correlates of the pleasure-tropisms.

Here belong all, perhaps even physiological, protective and defensive phenomena and methods of escape from enemies or the perils of the environment which are essential for survival and are precious because wrought out at great cost and through countless generations. In the life of the individual, and still more in that of the race, the way of orthogenesis is relatively straight and narrow and is the result of more failures than successes in the trial and error processes of evolution. Fear profoundly affects appetite, hunger and every

digestive, alimentary, nutritive and excremental process, the secretion of probably all glands, circulation with its attendant thermal changes, the *vita sexualis*, muscle tension and hence all voluntary and involuntary movements. It influences the function of every sense, stimulates or impedes thought and will, intensifies or even paralyzes all activity and even consciousness itself. It may disorganize all usual co-ordinations and adaptations to the environment. Fear always means a new situation which compels to a new adjustment. In new and dangerous situations almost any change helps and the greater the danger the fewer among all possible changes are those that could increase it and the more those that mitigate it. Hence it comes that often the most incoherent and even convulsive movements are, on the whole, beneficial. The greater the sum total of activities within and without, the greater the chance of escaping increments of pain. Since about everything has been feared even to morbid intensity, and since objects of fear are repellant, those animals and men with many fears lead restricted lives beset with limitations and taboos. Timorous creatures sneak, skulk, hide and may become nocturnal, subterranean, and fugitive in their habits, cowardly and deceptive in deed and word. Fearsomeness, too, stimulates the imagination to create fictive objects of dread and terror and much of the great body of degrading superstition is its product, and panics of this weird infection make the soul mad with baseless, craven horror. Fear invades sleep and shapes dreams which are the very opposite of wish-fulfillment. It has invented supernatural terrors for the nursery and a future life full of torment and woe. Much of the work of science has been to expel baseless and superstitious fears and to teach men to fear aright.

Yet fear has its fascinations, and strong, adventurous souls not only face danger when it comes, but go forth to meet it. Cowardice thus has its countervalent impulse in courage. The salt of danger is one of the great appetizers of experience. The prospect of pain acts as a tonic and one does not need to be a hero to love to take risks and to venture in order to have. Not only is one measure of values the dangers we will face to attain them, but curiosity, lust for knowledge, wealth, power, ambition control if they do not cast out fear. The great culture heroes set men free from fears. Without known danger life would be tame, insipid, asthenic. Men fight best if rightly afraid, and even weak animals which would fly when brought to bay fight with the energy of desperation. When the victim of delusions of persecution at

last turns and becomes himself a persecutor, he becomes most dangerous, as Magnan has so well shown.

Here then we have illustrations of the law of ambivalence which pervades the entire emotional life. Any emotion may pass over into its opposite, which latter then becomes the stronger because of the preceding antithetical state. The intensifying effects of complementary colors on each other, the well known laws of contrast, the Hegelian logic that proceeds by thesis and antithesis, are themselves, like the above illustrations, only very partial expressions of a far larger and deeper principle. In the first case the anticipation of pain, a state usually avoided as itself unpleasant, is actively desired for its own sake and perhaps because of the augmented sense of vitality it brings which makes us tingle and glow with a feeling that dormant powers in us are aroused. Danger makes us more alive. We so love to strive that we come to love the fear that gives us strength for conflict. Fear is not only something to be escaped from to a place or state of safety but welcomed as an arsenal of augmented strength, and so, instead of dreading, we come to love anticipations of pain. This, however, is only a sub-variant of the more generic case of the rapture of woe discussed in connection with pleasure and pain. The other more important case of it is the whip-row relation of fear that flies and anger that fights. Each of these readily passes over into the other and reinforces it. Even in the extreme of either the other is not entirely absent, so that both fear and rage have in them elements that reinforce the other. We always fear what we fight and would fight what we fear. But this theme we reserve for the chapter on anger.

This brings us to *hope* as the opposite of fear, the anticipation of pleasure as fear is of pain. These two interpenetrate and oscillate hardly less than do pleasure and pain themselves. Wherever there is prospect of a pain increment, there is also one of an increase of pleasure. Hence much, if not most, of what has already been said concerning the prospect of pain may also be said of the prospect of pleasure. The latter also has roots in the future and past but focuses in the present in a peculiar way. The foregleam of coming pleasure has given to life the organs, habits and other means of its attainment and has been a great factor in both the modification and development of both animal and human conduct. In order to hope we must have experienced pleasure and all hope is itself pleasure toned. It would attain and not escape. If its crucial moments of opportunity are less tense and its im-

pulsions on the whole less urgent and less charged with fateful significance and its instants of abandon to the end sought less pregnant of consequences, it has on the other hand increased in scope with the progress of civilization and the widening of the pleasure field till all now begin to hope for all. Each of these, too, intensifies the other and it is really fear with which the heart is sick if hope is deferred. Each of these, too, may become a diathesis and the balance and proportion of the two have much to do in making up the weal and woe of life. The expectation of pleasure may have all degrees of confidence from the faintest to the most assured, and oscillations up and down the scale may be constant for every object of desire. Hope impels plans for amelioration which the will is to execute. If in human life fear has predominated in the past, hope now increasingly prevails, yet most wild animals know far more fears than hopes. Hope, when freed from the function of reality makes dreams, reveries, illusions, myths and revels in the joy of fancied attainments. In optimistic moments, temperaments, theories and religions it predominates as fear does in those that are pessimistic. If the psychology of fear is superficial and inadequate, that of hope is almost non-existent for intimations of pleasure are too near, vital and all-controlling to be broadly observed or adequately characterized. The balance between these opposites is always tipping in every conscious or unconscious effort, otherwise motivation to action would be lost. Each, too, is the inverse measure of the other as the prospect of attainment alternates with that of failure. Their relation is so ambivalent that neither could exist without the other. Paretic delusions of grandeur are the extreme delusions of hope, as the horrors of delirium tremens or some suicide motives are of fear. The soul has many devices to suppress fear in order that it may the more indulge hope, and if all hope is gone suicide is the only sane and logical refuge of despair. Hope is benign, for it makes for expansion, progress, and new enterprises, while fear is malign because it not only represses but brings retrogressions. Thus whether we call fear an instinct, feeling, emotion or sentiment, we must call hope the same, for each is the affective converse or complement of the other, without which it can neither be understood nor explained, so that a broader knowledge of fear will have to wait upon future studies of hope which is at the same time the light of life and also the *terra incognita* of psychology.

Fear can only be understood genetically. Its reinforce-

ments and physiological expressions are full of atavistic rudiments, for we inherit not so much the effects of specific objects feared as the physical and psychic diathesis of fear. It long precedes the nervous system and its base is found in the very earliest and simplest forms of life. It is preformed by, genetically allied with, and doubtless avails itself of much of the energy of repulsion in the world of physics and chemistry, and this shades up into negative tropisms, taxies and tonuses in which we already see the embryonic *Anlage* of fear. When protozoa like paramoecia react to a stimulus by a fixed formula of motion—reversing the movements of the cilia and going backward, making an aboral turn and then going forward again at another rather constant angle—although these creatures have no life-history and many species of them react in a similar way whatever the stimulus, how or wherever applied, and do so even though the motion may bring them into more rather than less danger—all this shows hardly more psychic quality than mere irritability such as exists in the excised muscle of a frog's leg. Yet the extent and rate of these movements depend on the strength of the stimulus. During the series of sub-efficient stimuli applied to such a muscle so that, *e. g.*, at the tenth, on the average, the muscle contracts, it is assumed that the lability of its molecules is increasing during all the preceding stimuli and that their effects are summated. This physiological anticipation is abundantly proven although we know relatively little of its exact nature. So, when paramoecium is moving toward the center from which an acid is diffusing, we must assume some summative process anticipating the backward movement and turn. In the many similar studies of other protozoa so devised as to show their tendency to find an optimal position between the hot and cold ends of a trough, the right intensity of a solution, color, degree of light, distance from the anode or cathode, or even in some results of experimental botany upon the flagellate spores of certain plants—to say nothing here of phagocites and moving cells in the body—we may indeed regard these reactions as those of either a substance or of an individual, as due to physical or chemical attraction and repulsion and to mere mechanism, or we may assume some anticipatory pain with the antikinesis. We have here at least a matrix of pain anticipation and these movements are often effective as fugues from death or serious injury. These phenomena permit at least a pragmatic, quasi or *als ob* assumption of fear. If an unpleasant thygmo- or hapto-taxic or stereotropic experience were anticipated by ever so rudi-

mentary a visual, chemical, vibrational, thermal or other less unpleasant one, we have a condition for the fear state, as to the actual existence of which in these lowly forms of life we incline to rest not upon the safe and easy, agnostic *periculum credere aut non credere,* but, despite the fear of animism or even anthropomorphism, to emphatically postulate a fear state on the basis of the larger law of continuity. Just as the body, so the soul, is implicit in the foetus or fertilized ovum, although as different from the adult body as from the adult soul. To assume that the psychic element comes in at a certain point is only an attenuated survival of the old creation hypothesis. Let us rather say, then, that it is there from the first though we know not how, for the psychic rudiment is not so much the softest of all soft parts but it is, unlike germinal somatic forms, inaccessible to observation. In the same way, then, as the mature man is implicit in the ovum, so fear is implicit in the above conditions and if we had some kind of microscope that could detect the form or even some litmus paper that could test the presence of things psychic, we should see in such phenomena the real radical of fear. Just as the body is a colony of cells so we are compound minds with certain pontifical kinds of functions as of cells and psychic life is no less a genetic continuum than physical, with no chasms or gaps although with innumerable nodes, checks, accelerations, perhaps saltatory stages, explicable in very various degrees. The above phenomena, although not yet fear as man knows it, constitute its cunabula, or better, are its genetic predecessors. The question between Bethe, Uexküll, Beer, Ziegler, Roux, Loeb, Dantec, Pearl, Ludhoff, Gassey and many others who deny, and Wassmann, Binet, Forel, Verworn, Altmann and others who postulate a psychic element in lower forms of life, stimulating and fruitful as this question has been, is not yet and perhaps never will be answerable in terms of exact scientific demonstration, certainly not until there is some agreement as to what a psychic element is. This question suggests that between those who think phyletic influences are the chief ones in determining the development of the individual and those who, especially since the establishment of Roux's *Archiv für Entwickelungsmechanik der Organismen* in 1895, have been chiefly interested in showing the influence of chemical and physical forces rather than those of heredity as determining the processes of growth (His having even gone so far in his antagonism to Darwin, Haeckel and Weismann as to intimate that the growth of all parts and organs of the body in the embryo are the results

of successive foldings so that rudimentary organs are like "the superfluous pieces of cloth that are left over when a coat is cut out even in the most economic fashion," a view which Haeckel dubs the "rag bag theory"). Brilliant and voluminous as are the additions to knowledge made by the mechanists in both the above fields, those in the latter can never dethrone the mighty principle of phylogenesis, although they may make its sway like that of an ever more minutely regulated constitutional monarchy, while the tropists have really given far more than they have taken from psychogenesis.

Among the many conceptions of what the simplest primeval psychic element is like, *sentiency* has perhaps most often been proposed, but such a sentiency must of course be apart from and precede the deliverances of any special sense, even touch, the mother of most of them. Sentience, besides being too highly generalized to have any but a merely verbal definition, implies some kind of objectivity over against a subjectivity and this pair of opposites, which looms so large in the history of thought, cannot be very primordial. Introspection suggests the more intellectualistic *awareness* (*Bewusstheit*). But this is a generalization from the self-observation of mature minds and not an element, even though it be not quite fair to call it an abstraction. It suggests an incipient invagination impressed from without and not an inner state before and independent of any outward reference. It is at best only a noetic element and the impingement it implies is external, so it can only be a rudiment or antechamber of consciousness itself. Many others have suggested *choice* or a voluntaristic element or an act of will deciding between two alternatives or of attention selecting one thing in preference to another. But volition, too, is only one of the functions of the soul although its genetic roots doubtless strike much deeper than those of awareness, although to find anything preluding options we must go below the paramoecia. Again, *memory* in the sense of Hering has been a candidate for the holy motherhood of mind. It is understood as the basis of organized matter itself and so is in some sense deepest and earliest of all. It really means only registration or engramization. The influence of this concept has been not so much to psychologize biology as to biologize psychology. It is used as a principle not only of growth but of heredity, so that even plants remember their creator, the phylum, especially in the days of their youth. It applies to life at least quite as much as to mind and was a most pregnant and useful suggestion but cannot be accepted as the genetic criterion of the psyche.

Hence we must turn to *affectivity* and also go below consciousness and seek something not primarily objective, but the flushing up of a state, and this we find in the pleasure-pain state which seems best to fill the specifications. Whatever moves up and down on this scale is psychic and to do so marks the advent of the first psychic process. With this arose a new type of functioning and also of causation as new as life itself when it arose.

This first Eocene flush of mind was thus not a neutral state between pleasure and pain but one of them—euphoria or dysphoria—if pleasure, more diffused, if pain, more acuminated. In the absence of knowledge we would prefer to assume the former as the first faint sense of being alive. It was a tenuous, present, unanchored feeling good or well, but with no subject to know it and so no glimmer of *what* feels well and with no certain reference. Perhaps, on the other hand, this first phosphorescence of the psyche may have been algic, and the hedonic element later. At any rate these two points on the pleasure-pain scale emerged perhaps at first as separate outcrops in a hitherto apsychic world. But they were near, and the appearance of the junction between them was not long delayed and with or before this came the orientation of each toward the other and the scalar relation of reciprocity between them, one drawing, the other repelling. In some such way we may conceive the seeds of mind were formed and began to grow. Many have thought that the first manifestations of the psyche were far more rank and lush than any now, like vegetation in the carboniferous age or animal life in that of the great extinct saurians compared with their degenerate descendants today. Cope opines that primitive cells were more like brain cells than any other. So, too, the tickle sense with its intense phenomena may be a relic of the vivid nature of experience before touch had tamed down the contact sense to make it serve the practical purposes of life. Experimenters, again, have often noted how insects, crustacea and even lower forms react more quickly to slight stimuli than they do to strong, perhaps injurious, and even lethal, ones. Preyer even thought that the whole inorganic world was dead protoplasm, and studies of radium show how inconceivably greater are intra- than inter-atomic energies. So perhaps the psychic principle, when it first made its advent, was so crammed with potentialities yet to be realized in organized life that it shaped not only habits but organs, took control of the early zoölogical world and made things generally, so that in the field of life more

than we dream is due to germinal mind in the heyday of its prime, and thus we may even speak of the work of extinct mind in a sense larger than Lotze used it as having laid down reflexes and various forms of instinct, though this conception is much narrower than that of Schelling who saw in all the ascending orders of nature only dead or dying mind. The opinion is now often expressed that existing lower forms of life, especially those in the line of man's descent, do not fairly represent what their extinct congeners were when they contained in themselves the nisus which has since evolved into higher forms, but are only their still surviving poor relations. On this view ontogenesis is only a series of tiny pools trickling the one into the next in the bed of what once was a mighty torrent. If there ever was such a high tide of crude psychic life it might, before its energies were exhausted in modifying organs and shaping instincts, set back and fill previous possibilities which it had not done before, so that with the fore-and-upward-push of the developmental impulse there was a backwash that increased the psychic function of lower processes already evolved and caused it to break out where it had not appeared before (somewhat as important organs regress to the embryo and appear in earlier stages of development in proportion to the significance they have acquired in mature stages). On this hypothesis highly organized mind has been drawn out and is more or less spent or exhausted because differentiated and teased out into so many specific types of activity, its threads woven into new association textures, with, on the whole, vast gain, but not without much loss of the freshness and vigor it had when it was so homogeneous as to always act as a whole with all that was in it. Then fear, *e. g.*, knew no check, and vented itself with abandon and panic, and flooded or perhaps dammed all the sluices of activity. The power to anticipate pain was an epochful acquisition and gave great survival advantage to creatures who acquired and developed it. It was a state that tingled and glowed and absorbed all available energies so that no other state was possible, and it had every biological process at its mercy. Thus on the base line of the pleasure-pain scale, when it was once laid down, the most vital of all experience was acquired. Of course lives were narrow and only a few things gave pleasure or pain. The neutral stretch between them, too, might be very wide and there were more faint than vivid degrees of both, but each state was easily maximized and it was these that first made primitive life psychic as it oscillated from one to the other or ceased, sink-

ing, when poised between them, beneath the threshold which separated mind from life.

This brings us to *shock,* the specific nature of which, and its relations to fear, have never been adequately understood. Here there is no anticipation of pain and therefore no fore-feeling of it, but the pain is sprung without warning. This Spencer makes the psychic beginning. There is no preliminary dis-ease but a detonation of pain, which comes perhaps with fulminating suddenness, with no rudimentary set, *Einstellung,* and with no fore-gleam of expectant attention to prepare for it. Nothing better illustrates psychogenesis than do the reactions to shock, or shows how pervaded psychic life is by paleo-atavistic vestiges. It may find its chief expression in any part or function of the alimentary canal, affecting appetite, mastication, deglutition, secretion of all the glands from mouth to anus, peristalsis, defecation and micturition, may bring all kinds of unwonted sensations, tonuses or relaxations and modifications of every anabolic and katabolic stage and process. It may vent itself in the circulatory system, accelerating, retarding or even arresting the action of the heart, modifying blood-pressure, causing pallor or flushing and affecting even the composition of the blood, and is somehow closely correlated with the activity of the adrenals or their product. Respiration, too, is always affected. The voluntary muscles may be relaxed or tense and there may be tonic or clonic cramps or diffuse convulsibility and "masses of clotted motion" or almost any specific act, attitude, or perhaps paralysis. In the nervous system it may affect any or every sense, either intensifying or almost suppressing its action, may quicken the mental functions or more commonly arrest or disintegrate them into their proximate elements or bring insanity or even amentia, and create morbid complexes, obsessions and phobias galore, causing schizophrenia and even persistent changes in the moral character, or may strike the sexual nature and bring polymorphic perversions, inversions and about every type of arrest. The chief point here to be noticed is that these effects of shock are always more or less reversionary. They strike the weak points and may erupt in any phyletic level, the assimilative, secretive, sympathetic, autonomous, affect the lower or higher spinal, the sub-cortical or cortical centers, but there is always a downward tendency on the phyletic scale. Thus shock and probably fear reactions have no specific center or zone but may occur in any, and the diathesis of vulnerability to them may vary much with individuals and in general; to understand them we must not only

know the personal history of the subject but something of the laws of heredity and the history of the race.

Thus the utterly new and sudden is always dangerous because we lack the apparatus to react fitly to it and so lapse to elementary responses and these, like rudimentary organs, are highly variable because long side-tracked and dispensable. Such reactions often act as emergency-functions to relieve inner tension and, like fire-extinguishing devices, may fail to act or break down from long disuse at the critical moment. Thus shock brings out prehistoric and sometimes even embryonic activities. When the synapses that usually transmit from the receptor to expressional spheres are either blocked or overpressed, movements cease to be coherent or purposive and reinforcements, inhibitions, or both, are wild. Had our forbears always had only such experiences as they could meet adequately, higher, lower or louder notes of life might seem harmonious and be danced to aright, and we might be poised and resourceful in more startling exigencies. On the other hand, if the individual and the race had had more intense experiences we might, even without any erethic warming up, have acquired the power to digest more exceptional and unforeseen emergencies. Conversely, much and frequent experience with excessive shock is liable to develop and fix low level and abnormal modes of response, and this sometimes brings deep-seated and persistent dread of reality lest we react to it in ways that ought to be obsolete; and so we blush, tremble, sweat, feel nausea, the impulse to relieve the bowels, grow breathless, show tics, awake senseless phobias and lose presence of mind instead of acting sensibly and with courage. These old primary effects, secretory, vaso-motor, bristling, goose-flesh, etc., are the more intense the lower we go on the animal scale and the less the influence of the cortex, which tends to suppress them, even although some think a few of them may serve some useful purpose by way of kindling or arousing the higher centers to act although these extravasations always detract and waste energy.

This great principle of the reversionary nature of shock applies all the way from plants, which the botanist Ettinghausen showed exhibit *Rückschlag* phenomena if mutilated or if cold, up to the moral relapse to savagery Lombroso and Wagner first pointed out as characteristic of criminals. If the cerebrum with its moderative and directive influence is removed, animals, as Goltz and Bechterew have proven, show very intense symptoms of fear and so do human monsters born without brains, or hemicephalic children, as Sternberg

and Lotzko have demonstrated. Many invertebrates respond to shock by immobility or cataplexy, a reaction of great service among lower forms, the enemies of which have imperfect eyes chiefly sensitized to motion and which therefore seem to assume that most which lives moves, and this survives in man in paretic states or weakness. Buckman found certain little twitchy *klammernde* movements in the hands and feet in fright which remained longest in the hands, which he deemed relics of flight during the arboreal life of our ancestors. Mosso's rabbits responded by paling or reddening over the whole or in parts of the ear at a whistle, a bird flying over or even a cloud obscuring the sun. Frightened apes leaping from bough to bough evacuate, not as was once thought, to deter their pursuers below but by way of lightening their bodies, expressing their emotion by peristalsis, sphyncter relaxation, or both. Darwin could not hold his face close against its glass cage when a puff adder struck at him. Thus we can understand why some men who are heroes in their cortex cannot help being cowards in their pons or solar plexus. Revivals of old, long-submerged, dendritic or even pelagic stages of evolution thus may surge up and evict the judgment and master the will. These primeval reflexes may subject the most intelligent cortex, even although they are innate reflexes formed in primeval times. They thus have their innings. From this viewpoint no less light is shed upon the normal genetic psychology of shock and fear than it has lately brought to the analysis and therapy of neuroses and psychoses, and these two must not be separated from the emotions, as they have unfortunately been in the studies of the intellect and will.

Shock even more than normal pain brings a new fear, viz., that of its reflex effects. We dread self-betrayal to others and also the strain, pain and danger it brings to our own organism. To be liable to be reduced to an automaton and to play off these old reactions that it is the business of culture to repress, to unleash and exhibit these dragons of the prime that slumber in us, to be thus suddenly dragged back to the lowest meristic, if not almost vegetative, levels, brings its own special types of obsession. We grow tense, hold onto and repress other instinctive tendencies than those fraught with danger and so there is often a diffusion and substitution of restraints, usually sub-conscious, which it is the business of psychoanalysis to lay bare. These dormant forces in our nature, always on the alert to surprise us if occasion arises, seem uncanny and often supernal for there is nothing

man knows so little of as of the lower strata of his own psychophysic nature and in no situation is he so prone to eject, personify, and deem himself possessed by supernal agencies or beings as when he is the victim of these recrudescences. It seems not his ego but the eruption of an alien being. It is thus in experiences like these that the supernatural has its last stronghold, as modern spiritism and telepathy show; and Stekel has pointed out in great detail how what man really most fears is himself, because his inner primal nature is that which he knows least and which may seize and control most completely both his body and soul.

To the geneticist the individual is a bundle of organs and traits of very different ages and stages of development as well as of usefulness. A few score of rudimentary organs, according to Wiedersheim, survive in the adult. Many reached their acme, declined and perhaps vanished before birth, while some organs and tissues seem growing, if not young, in old age. Some of the superseded ones are metamorphosed over into other organs useful to the adult. Some are mere vestiges of parts once of vital importance in some earlier phyletic stage. Possibly some are buds and they have their day again in some higher stage of life. True rudimentary organs tend to persist and they may become detrimental, absorbing vitality and becoming inviting seats of pathogenic organisms. Retrogressive organs are susceptible to lesions which may entail serious consequences for the individual. Thus some of them are old when we are young and perhaps our true physiological age is that of the average age of the different parts and traits, the long and the short lived taken together. Hence the infant is long phyletic stages older than the adult, and what we now call maturity, and still more old age, is a recent acquisition of the race resting upon far older foundations. Possibly all the Mendelian, Weismannian or Semonian and other hypothetical units that are supposed to carry hereditary impulsions and with the power to vary independently of each other, belong themselves to different stages of phylogenetic development, and, on the other hand in men, many differences in physical and psychic traits may be due to the different net age of their aliquot parts and the points of their arrest under influences which are always inhibiting or stimulating the all-dominant momentum of growth. In some individuals the average growth is so retarded that they retain juvenile and perhaps puerile qualities through life and seem never to grow old, as in ateleosis, while others hasten prematurely to their

goal in porgeria. More commonly, however, both the acceleration and retardation are not general but specific.

From the studies begun by Roux, O. Hertwig, Born and Schaper more than a decade ago on amphibia and other lower vertebrates, and advanced by many others since, it seems now established that up to a certain point of embryonic growth, varying with species, each organ differentiates and grows by itself independently of others and quite uninfluenced by the central nervous system. They may of course compete with each other for the available nutritive material, but the morphological development of each is by and for itself and their association is only that of a mosaic. At first the cerebrospinal system neither receives nor sends fibers to the parts and it may be removed without affecting their course of development. The same has repeatedly been observed in anencephalous amyolitic monsters that may live up to or even after birth, while each part develops from its own hereditary impulse with little reference to the whole. At a later stage the central nervous system may exercise over the growing parts some trophic influence, but no functional stimulus from it is needed or received, and the organ grows without functioning and without correlation with others. At birth, however, functioning begins to take precedence and growth comes to be dependent upon it; *i. e.*, there was relatively very little before but now it is essential for the further stages of development. The nervous system now begins its great work of correlating and unifying the functions of the parts and organs and also psychic life, which is closely bound up with these processes, has here the chief of all its impulsions. At this epoch the components of the individual which have unfolded in comparative isolation are knit together into a more or less compact and harmonious organization and also more subjected to the rule of the nervous system and an era of synthesis and at the same time subordination is inaugurated.

Now begins the great work of compensation which A. Adler[1] has best characterized and which is the most important key not only for abnormal, as he deems it but, as we believe, for normal genetic psychology, a view which may be characterized as follows: Every subnormal (*minderwertige*) is more plastic and adaptable than normal organs or functions. Under the stimulus and protection of the central nervous system when it has taken the helm they may become not only

[1] A. Adler. *Studie über Minderwertigkeit von Organen,* 1907, pp. 92, also *Über den Nervösen Charakter,* 1912, pp. 195.

more variable in other ways but may even become supernormal. What is more important, they may be compensated by other organs or functions with which they are correlated. Moreover superstructures are built which vicariate for them, supplementing their deficiencies. Thus recalling ,as we saw above, that man is a congeries of many organs in various stages of evolution and decline, the nervous system when it comes to power establishes a set of interrelations between those that are essential under the impulse of the will to live. Leaving some to decline and powerfully stimulating others to unfold and develop, by keeping them sufficiently but not too much in exercise, it reinforces both atrophy and hypertrophy. In the effort of the psyche to foster the important organs and functions which it selects for its special care, organic defect may be compensated by excess of nervous activity. Indeed, most compensations are in the psychic though not necessarily in the conscious field. No one is perfect, and hence compensation is necessary for all. It makes for, if indeed it does not make, consciousness itself. Those organs and functions which the psyche cannot directly or indirectly control decay or become stigmata. Where the brain fails to establish a compensatory system we have all the hosts of neuroses and psychoses. The existence of sub- or abnormal organs or functions always brings Janet's sense of incompleteness or insufficiency, and this arouses a countervailing impulsion to be complete and efficient which those to whom nature gave lives of balanced harmony do not feel. The ideal goal is always to be a whole man or woman in mind and body, and this may crop out in the childish wishes that are sometimes fulfilled in dreams, in the ambition of the boy who aches to be a man, and in general in the desire to overcome all defects and to evolve a full-rounded, mature, powerful and well-balanced personality. To illustrate, each bilateral organ compensates for defect in the other, one sense for another like touch for sight in the blind. Mozart had an imperfectly developed ear; Beethoven had otosclerosis; Demosthenes stammered and, as if mythology had recognized this law, many of the ancient gods were defective. Odin had but one eye; Tyr, one hand; Vulcan was lame; Vidar dumb. So, too, the ugly Socrates made himself a beautiful soul. A man with a weak digestion becomes a dietetic expert in battling with fate. Little men walk straight; tall men stoop. Handsome men are superficial. A subnormal eye intensifies the visual psyche. In the effort to control enuresis due to renal insufficiency over compensation may predispose to even dreams of

water. Sex weakness is supplemented by fancies of superpotence. Many diseases have compensating forms with which they alternate or for which they vicariate and the very principle of immunization is involved. Weak parts and functions draw attention and are invigorated thereby. Fear of an object excites interest in it and this brings the knowledge which casts out fear. Very much of the total energy of all of us and still more of that of neurotics and psychotics is spent in developing and using devices of concealment (*Deckphenomene*) of diseases and defects. Thus often the higher protective and defensive mechanisms come to do the work of the subnormal function even better than it would do it. Conversely compensation has its limits and when it breaks down we have anxiety, the most comprehensive of all fears and the alpha and omega of psychiatry, the degree of which is inversely as the ability to realize the life-wish of self-maximization. It involves a sense of inferiority, inadequacy and great inner tension. The goal may be the humble one of self-support, normality, merely absence of actual pain, or deformity, but the prospect of failure to attain it brings a distress probably equalled by no other form of suffering and every fear is a special form or degree of it. If the good, strong, healthy, higher components can neither improve nor atone for the bad, weak, low or morbid elements, anxiety, conscious or unconscious, supervenes, values lose their worth, we tend to take refuge from reality in fancies, and innate momenta are arrested and we suffer we know not what, perhaps fear itself.

Freud is wrong in interpreting this most generic form of fear as rooted in sex, worries concerning which are only one of the more specific, if common and most typical, forms of its expression. Sex anxieties are themselves only symbols of this deeper sense of abatement of the will to live, to be powerful, to illustrate in our own personality the whole estate of man, to glow with the humanistic totalising motive to be citizens of all times and spectators of all events. Of this sex anxieties are only parables, *modi dicendi,* or most ostensive instances of a larger general law. In the super- or sub-conscious structure of the soul, minus are cancelling plus qualities, and instead of hearty abandon to life there is halting, vacillation and uncertainty, if not incipient renunciation, which may go on to despair or utter loss of hope. Stekel has urged that the ultimate fear is that of death or annihilation, and infers that belief in immortality gives bravery when we confront the ills of this world but makes us cowards towards those of the next. This and the dread of death-dispensing agencies like

disease have motivated all hygienic devices. Special phobias too often relieve general anxiety by concentrating it in one direction, as *e. g.,* acute fears of darkness may relieve us of anxieties during the day. When life is beclouded by pain love of it abates, although we do not know it, and sorrow makes us even less cautious against accident, so that, other things being equal, a man who is frankly happy is a better insurance risk, and as the biographies of Segantini and others show, has more power to resist disease. Sex fear plays a great rôle in psychopathology because its pleasures are most intense and all creatures are most vital when most procreant and because this function conserves the immortality of the race.

In a large and pregnant sense consciousness itself is compensation, and is the psychic aspect of a deeper biologic law. In geniuses as in neurotics, it comes more to the surface. Berger's story of a born criminal who became a judge and was noted for his Draconian severity but who lapsed to crime and committed suicide, leaving a confessional autobiography, is typical of one aspect of it. The work of great artists is often a complement of their lives, expressing in most ideal form what they most lack. If the heart, digestive processes, lungs, muscles, are weak or go wrong, they come into consciousness, and curative agencies are initiated. Pain is a cry of the lower, older parts and functions of our organism to the higher nervous system for help. Paranoiacs tending to delusions of greatness and hyper-self-feeling are often overpolite to others. The sense of defect prompts training and education to cure and also countless devices to hide them. Culture corrects the errors of instinct and dress hides deformities. Thus nurture supplements nature, and environment has to rectify heredity. These processes constitute consciousness, which is always more or less remedial. Taine conceived it as a mutual repression of opposite impulses and tendencies, any of which if not checked would develop into insane intensity, and he deemed the neuroses as only the most intense form of it. Where these integrating and compensating processes have more than they can do and break down, whether from strain of outer circumstances or because they find inner resistances too great, so that the power to rectify and adjust is exhausted, abatement of the life impulse is felt, and this sense of abatement is anxiety, diffuse or acute. It is the bi-polar opposite of the pleroma of life abounding, which all crave. From this point of view, then, consciousness itself is incipient anxiety.

This brings us to one of the most interesting and important

questions of genetic psychology, viz., whether, and if so how, fear is inherited, to which the general answer may be given that the anxiety diathesis is one of the most inheritable of traits, while fears of special objects are so only to a very slight degree. Organs and functions little used tend to regress and become more rudimentary and embryonic. Compensation may shelter and relieve them by providing for their work vicariously and thus facilitate this process of decay. This, however, commits the higher vicariating organs and functions to more than their normal work, but this compensating hyperfunction is an acquired quality and so less hereditary and must be re-acquired in each successive generation, the regression of the primary older traits being much slower. Overworked organs and functions tend also to decline in the offspring, and so the disproportion becomes cumulative. Moreover, where components fall back they also fall apart, and the integration on which the wholeness of the ego depends is impaired, and normal synthesis impossible, even though the environment (every change of which requires new compensations and adjustments which may either help or mar) be most favorable. Now sex is the function by which these inner disharmonies are transmitted. Hence it comes that the *vis reparatrix naturae* makes here its greatest restorative effort. Love is the chief complementary agency, with its basis deep in the processes of cross-fertilization. Love is between not replicas but counterparts, and its aim is to supplement deviations from the norm, the degree of divergence of which seems to correspond to the passionateness of love. We love in others those traits we lack, and thus tend to correct our defects, and hence it is that neurotics turn to the love cure with most abandon. A deep, complex racial instinct, many factors of which are far below consciousness, impels to interest in the *vita sexualis,* which is the organ of the relations of the individual to the other sex and through it to posterity. From the above we see how prone its components are to be characterized by excess or defect, and thus prone to disorganization and most in need of compensation, while impairment, inversion, perversion and excesses are always found with polymorphic fears and manifold gross crassifications, sublimations, exaggerations and repressions, with their alternating extremes of abandon and control. Proclivity to these disorganizations of this fundamental and complex instinct, expressing the race in the individual, not only profoundly affects heredity by impairing its efficiency but is itself one of the most inheritable of all complex traits, so that disturbance here constitutes the

rankest soil not only for anxiety but for specific fears. Such a diathesis predisposes to fearsomeness in domains quite outside its own and, as Freudians have shown, is easily transferred, takes on many substitute and symbolic forms, which the sufferer himself finds it hard to unmask and recognize for what they really are, so intense and incessant is the action of repression. But while this abnormal hyperconsciousness of sex may have recourse to almost any symbolic expression, we must not forget that for every even tolerably normal individual fears of losing power, possession, or of accident, animals, diseases, outbreaks of anger, etc., have their own independent causation and use not only many of the mechanisms which recent sex studies have revealed in it, but others that have no connection with sex, so that predispositions to these affectivities are peculiarly prone to be inherited. The *summum genus* of fear thus is a sense of the inability to cope with life, a dread of being vanquished and becoming not victors in its battle, a sense of limitation and of inferiority in our power to achieve the fullest success and happiness, a feeling that our hereditary momentum was originally insufficient or is in danger of being reduced. We would do, be, get all that is possible for man's estate, attain the fullest macrobiotic development, and fear and shock are intimations that we fall short, are less than we might, could or should be. This excelsior impulsion encounters obstacles and suffers arrest, and desire, ambitions, possibilities, may fail. Hence pain and its anticipation, fear, and their diaphrenic opposites, pleasure and hope, play a great rôle in the evolution of the affective life, not without analogies to that assigned to nothing and being in the Hegelian logic. The thesis, antithesis and synthesis of the one are the basis of an affective, and those of the other of a rational, dialectic system. Hope and fear have had very much to do in shaping not only habits, instincts and probably structure itself, but in making mental and nervous disease or health. Indeed from the genetic standpoint they are the creators of consciousness itself, from its lowest to its highest form.

For years I have kept tab on the phobias or morbid fears described in literature, chiefly medical, and these are tabulated below. Some have an extensive literature and some only brief mention, illustrated, perhaps, by a single case. Besides these there are very many others, mentioned in the description of cases, for which no Greek name has been suggested; for instance, fear of the several hundred diseases which the English Pharmacological Society attempted to catalogue, many of

which have been objects of abnormal fears. Many, if not indeed most, objects of nature have been feared unreasonably at least for a time, especially by children, who normally have and outgrow many phobias. About every thing and event at first may excite undue fear, which experience tends to eliminate or tone down to reasonable intensity. No good classification of phobias exists, but they will doubtless be reduced to something like genera, species and varieties, though no psychological classification can ever be based upon objects, for these are largely accidental and generic fearsomeness or anxiety readily changes its objects.

MORBID FEARS

Phobia	*Meaning*	*Phobia*	*Meaning*
Acero-	Sour	Demono-	Demons
Achluo-	Darkness	Dermato-	Skin
Acro-	Sharpness	Dike-	Injustice
Aero-	Air	Dora-	Fur
Agora-	Open spaces	Eisoptro-	Mirror
Aichuro-	Points	Elektro-	Electricity
Ailouro-	Cats	Entomo-	Insects
Akoustico-	Sound	Erete-	Pins
Algo-	Pain	Eoso-	Dawn
Amaka-	Carriages	Eremia-	Solitude
Amatho-	Dust	Ereutho-	Blush
Anemo-	Wind	Ergo-	Work
Angino-	Narrowness	Geno-	Sex
Anthropo-	Man	Geuma-	Taste
Antlo-	Flood	Grapho-	Writing
Apeiro-	Infinity	Gymnoto-	Nudity
Arachne-	Spiders	Gyne-	Women
Asthено-	Weakness	Hapto-	Touch
Astra-	Astral	Hamarto-	Sin
Ate-	Ruin	Harpaxo-	Robbers
Aulo-	Flute	Hedono-	Pleasure
Aurora-	Northern lights	Hemato-	Blood
Bacillo-	Microbes	Hodo-	Travel
Baro-	Gravity	Homichlo-	Fog
Baso-	Walking	Horme-	Shock
Batracho-	Reptiles	Hydro-	Water
Blone-	Needles	Hypegia-	Responsibility
Bronte-	Thunder	Hypno-	Sleep
Cheima-	Cold	Ideo-	Ideas
Chiono-	Snow	Kakorraphia-	Failure
Chrono-	Duration	Katagalo-	Ridicule
Claustra-	Closed spaces	Keno-	Void
Cometo-	Comets	Kineso-	Motion
Cremato-	Money	Klepto-	Steal
Cromo-	Color	Kopo-	Fatigue
Chrystallo-	Crystals	Kristallo-	Ice
Cyno-	Dogs	Lalio-	Stuttering
Deme-	Crowds	Linono-	String

Phobia	*Meaning*	*Phobia*	*Meaning*
Logo-	Words	Phasmo-	Ghosts
Lysso-	Insanity	Phobo-	Fears
Mania-	Insanity	Photo-	Light
Mastigo-	Flogging	Pnigero-	Smothering
Mechano-	Machinery	Poine-	Punishment
Metallo-	Metals	Poly-	Many things
Meteoro-	Meteors	Poto-	Drink
Miso-	Contamination	Pterono-	Feathers
Mono-	One thing	Pyro-	Fire
Muso-	Mice	Rypo-	Soiling
Musico-	Music	Satano-	Satan
Nekro-	Corpses	Sela-	Flash
Nelo-	Glass	Sidero-	Stars
Neo-	New	Sito-	Food
Nephelo-	Clouds	Sperma- (Spermato-)	Germs
Noso-	Symptoms	Staso-	Standing
Ocho-	Vehicles	Stygio- (Hade-)	Hell
Odonto-	Teeth	Syphilo-	Syphilis
Oiko-	Home	Thaaso-	Sitting
Olfacto-	Smell	Thalasso-	Sea
Omata-	Eyes	Thanato-	Death
Oneiro-	Dreams	Theo-	God
Ophidio-	Snakes	Thermo-	Heat
Ornitho-	Birds	Toxo-	Poison
Ourano-	Heaven	Tremo-	Trembling
Pan- (Panto-)	Everything	Zeino-	Strangers
Partheno-	Girls	Zelo-	Jealousy
Patho-	Disease	Zoö-	Animals
Patroio-	Heredity		
Penia-	Poverty		

We pass now to a few of the most generic types of fear. (I) *Fear of shock.* Experience as it unrolls moment by moment may be roughly divided into two kinds, the ordinary and extraordinary, or the expected and the unexpected. To the former we are adjusted by habit and the sequence of events in it is anticipated, and we respond sanely and naturally. The other class of events is sprung on us without warning, such as accidents, death, perhaps sudden loss of property or good name, involving rupture of continuity of the stream of consciousness. The simpler forms of shock are very common in the life of children, of which we have many hundred records before us of many kinds, from being said "Boo" to or "jumped out at," hearing a new clock strike, a Jack-in-the-Box, being stolen up to or touched unawares, a discharge of firearms or any other sharp noise, barking or attack by a dog, a crash of thunder, a sudden sneeze, etc., to being run away with, burglars, shipwreck, cyclone, earthquake, falling into or having cold water dashed over the body, suddenly finding some one present instead of being alone, as was sup-

posed, a shock from a battery, a blast that went off near, fires, accidents, or bad news of near friends, many of these effects being greatly increased by darkness. Many children's plays focus in causing a start, a sudden surprise or alarm. Probably both physical and psychic shock is rather more common with children because of their lack of experience than with adults, and the element of shock is not infrequent in their dreams. For normal children an element of shock in their sports seems to have a veritable charm, and they appear to be strengthened and satisfied by learning to suppress its ill effects and in securing the optimal degree of it that is most favorable for the development of self-control and presence of mind. This differs very greatly with individuals and is often dangerous to neurotic children. The very incoherence of the mental processes of children makes shock less perilously disruptive than it is in later life after careful observation, associative thinking, together with wont and custom, have knit the factors which compose our mental life into a more complete unity. The reactions of children to shock, as we should expect, are very manifold. Some grow rigid, with every muscle tense; others limp, paralyzed, and perhaps almost ready to collapse. Creepy-crawly horripilation symptoms are often mentioned. The heart throbs, there is flushing or pallor, the eyes are fixed, the mouth opened, they pant, perhaps make a wild rush, scream. Both facial expression and attitude are very similar to those found in exophthalmic goitre (Grave's disease), or in the photographed faces of athletes at the crisis of their efforts. In shock the mind fails to grasp the whole situation and so the active responses are ill-adapted to meet it. There is often a period of utter mental confusion although sometimes only an initial start followed by an outburst of rage against the cause of the fright, and manifestations of mortification at the betrayal of weakness and loss of poise, although others can laugh it all off as a joke. On the other hand, shock is often the nucleus of a phobia which irradiates by association to many items of place, person, and circumstance, and which may persist for years. Psychic, cardiac, neural and many other traumata may thus be caused either suddenly or with onset so gradual that the symptoms do not suggest the real cause. One child, *e. g.*, saw a case of sunstroke and had for years almost a mania for keeping in shady places and would go far around to avoid sunshine. Another child saw a barn blown down and became an anemophobiac, and so we have phobias of animals, lightning, cars, burglars, fire, firearms, and some of these long dreads evolve a set of

fantastic precautions sometimes endless in both variety and detail. Most children have many of these fears in intense forms, perhaps in silence and unbeknown to their friends, and completely outgrow them later. Sudden phenomena thus have a psychology of their own.

If pressure be applied gradually enough an excised motor nerve may be crushed without causing the muscle to which it leads to contract. It may also be heated, cooled, electrified, acidified or alkalined to the lethal point so gradually as to cause no movement. Normal frogs may be placed in water heated so slowly that they may be boiled to death and make no movements. So pressure may be applied to the human finger so gradually as to pass much beyond the ordinary pain point without any perception of pain, and movement on the skin may be so slow as not to be perceived. Certain secular cosmic changes follow the same law. Thus we may conclude that to excite consciousness every change must have some degree of suddenness, and Spencer finds the very origin of mind in some primitive form of shock. Below certain limits of abruptness in change of stimuli to which it is a response, psychic life cannot exist. Perhaps anything might occur to us without our knowing it, if it came slowly enough, while, conversely, the most common gradual changes if they came with great and unusual suddenness would cause shock. Thus here again we have a time function. Again, subjectively there is some doubt whether we can perceive gradual changes as such. Instead of an image or feeling of continuous increment or decrement, some believe that we derive it or infer it from a comparison of graded stages, which the mind seizes upon in the series, and that the intensive continuity is like that of the cinematograph. Others hold that the experiences of continuity are primary, as notes are measures of changes of ungraded pitch like those of the Aeolian harp, which preceded and conditioned the scale, for their intensity changes are primordial, as Trendelenburg made motion his prime category. For them degrees and gradations are later applied to changes which were originally without them, a view on the whole more consonant with geneticism as well as with introspection.

Between their threshold and the degree of intensity which causes shock, stimuli vary greatly in strength and evoke their normal responses with much regularity, depending upon fatigue, temperament, experience, preparedness, etc., and it is within these limits that by far the most of what we call experience takes place. Below this threshold lies a vast field of unconscious response to faint and slowly changing stimuli.

Training, interest, and many other influences are constantly widening the ever-variable interval between just-perceivable alterations and their upper limit where shock begins. Between these limits increase of both intensity and suddenness of stimuli is met by increased intensity and lessened reaction time in the response. Shock, however, always brings perturbation, cerebral commotion, confusion, and many pathological symptoms, both psychic and somatic. One group of theories represented by Goltz, Gross, Schneider, Crile, Blum, Agnew, Brewer, think that the cause-effect of shock is chiefly circulatory, either loss of vaso innervation involving the vagus or pneumo-gastric reflex, with increased or lessened blood pressure or changes in the constitution of the blood itself, both of which undoubtedly occur. Others, Groeningen, Oppenheim, Hodge, Warren, Strumpel, find the lesion chiefly in the nervous system. The nucleus of its cells shrinks and becomes vacuolated, darkens by becoming charged with the uneliminated products of decomposition due to excessive katabolism, and some place the center of exhaustion in the medulla or spinal cord where spots of degeneration may appear. Henderson thinks general or local apnoea or lack of oxygen is the chief effect, at least in cases of surgical shock. Another theory suggested by Erichsen in 1868, and revived and much discussed a decade ago by neurologists, is that the processes that connect one nerve unit with another make ameboid-like movements, bringing them into contact with others, which represents association, or breaking these connections by retraction, as in cases of shock, and thereby causing psychic dissociation. Amoeba tend to ball up if disturbed, retracting their processes and presenting less surface, and on this theory the nerve elements retain some slight degree of this power. In this way certain psychophysic groups of elements are more or less excluded from the influence of others and act independently because the whole has lost control over the factors that compose it. Thus even dual, multiple or parasitic personalities or complexes are split off or isolated from their connections. Shock thus literally shatters the psyche through its neural centers and tends to resolve it into its proximate elements. If any such movement of terminal cell processes is possible, we might well expect that shock, which is the most drastic of all experiences, would be most likely to cause it. It might indeed have much to do in forming the plastic brain of the child and especially in isolating functions that education and experience seek to integrate so that the individual shall act as a whole. This theory thus proposes a physical basis, not only

for shock and schizophrenia, but for fatigue, sleep, dreams, imperative ideas, etc. Some think that on this hypothesis shock may even in a secondary way cause new associations, the creation and rupture of which are due to connection and disconnection of the processes between more or less independent neurones. This kind of movement, however, is not at present satisfactorily proven, although Harrison thinks that traces of it appear in the growing nerve fibers of the embryo, but these like the movements of contact-granules at the distal end of dendritic processes may be significant only for metabolism or perhaps growth. Again, as the neurone theory has of late more or less made way for that of the synapse, shock has often come to be considered as a sudden lowering of the resistance, or an increase of the permeability of the synapses involved. On this theory shock is not due to irritation from the brain or inhibition, but something like a rupture of tenuous septa of aboral conducting paths. Neuropsychic connections depend then not on the make and break of nerve processes but on the permeability of synapses, which ranges through a long scale of degrees dependent upon habit, experience, fatigue and even heredity. When the synapse is flushed in shock as by a freshet, these tiny resistance surfaces are made more permeable and some of them that would have withstood almost any normal process may almost break down, and then these impulses irradiate into channels that should have been, and perhaps have been in the history of the race and the individual, long closed to them. Shock always tends to discharge downward in the more primitive zones, instead of in the forms that modern civilization has made usual, as if the synapses that should bar the way to these old types of reaction were too weak to do so in psychopathic constitutions.

Shock may affect about every sense and function. In the field of sight it may disturb accommodation, modify the size of the pupil, the tone of the retina, the eye-ball may roll or be fixed with almost cataleptic rigidity, there may be photopsia or subjective sensations and even color-blindness. In the field of audition it may cause deafness, transient or even permanent, and may bring supernormal acuity of hearing, as well as cause vestibular vertigo. In the domain of the dermal senses it may cause anaesthesia, local or diffused, and its effects may extend to the corresponding part of the body on the other side. Subjective skin sensations often appear and while the sense of contact is unimpaired, that of pain and temperature may be affected, one or both. In some cases the

trauma affects smell and taste. Stammering and other modifications of speech and of the quality of voice sometimes ensue. Very many are the effects of shock upon motor control. There may be tremor, rigidity, flabbiness, paralysis, and various automatic and uncoördinated movements. Manifold changes occur also along the entire alimentary tract and its annexes. In place of appetite we have nausea and there are various excremental irregularities. The digestive process sometimes seems to come to a standstill while circulatory and respiratory activities increase. Neurasthenia and even insanity occasionally result, involving many neuroses and psychoses. All this is abundantly illustrated in the voluminous clinical literature upon the subject. Geneticism assumes that every one of these and all other responses to shock are vestiges of once useful reactions, that the visual symptoms are relics of an effort to find and then fixate some dreaded object, that accommodation would be, on the principle of self-preservation, first for a near point and then for one farther off, and that when the object was found the gaze would be fixed upon it with an almost cramping intensity. Studies of the stages of awakening from dreams show that mental may produce optical images by eccentric projection, and all the retinal, as well as the changes of eye-muscles, resulting from shock, would probably be caused by an intense effort of all the central and peripheral organs of vision to get the source of danger into the focus of the field of vision. In such drastic impulses the power to find and the power to make an object seem to shade into each other, perhaps by insensible gradations. When we are shocked there is an optical *Einstellung* that an object is to be seen, and this is so sudden and intense that if the cause is not seen, subjective sensations may sometimes take its place. As to the ear, it is known that unexpected detonations are more likely to injure the organ than are those that are anticipated, as well as that most shocks of early infancy are in the field of this sense. Next to the eye the ear is the distance-septor that guides movement in crises, while the function of the semi-circular canals would be strongly appealed to by way of giving equilibrium for either fight or flight. Auditory sensations too are great muscle tonors, and introspection shows that many people hear music in their muscles, so closely wed are sound and movement. While blindness and deafness would be lesions helpful only to foes, and hyperfunction of these senses would be normal, the dermal anaesthesias that are common in shock would be very helpful in a life and death struggle with enemies, and also with the forces of nature, as

this would render the contestant unconscious of, and so undisturbed by, his injuries. A conflict, too, would involve rise of temperature, activity of not only the sweat but salivary, and perhaps other glands, although the functions of some seem to be inhibited. If one side of the body was disabled the other would naturally be called into function. In mortal combat the very odor of man's animal foes, and, when he once used his teeth, their taste, would be a painful part of the experience. Speech, if it had been acquired, would be useless, and would be superseded by inarticulate and reiterated cries for help or to terrify the foe, while the timbre of the voice would take on a new quality. Tremor due to shock is a relic of what was perhaps once readiness of muscles and limbs to act in one of perhaps several opposite ways and we quake because our forbears used to be for a critical moment equally ready to do a number of the most diverse things, the original fluctuations being those of indecision, while in the motor incoördination that is so characteristic a symptom of shock, we see the residua of brief selective struggles between older or phyletic and newer types of response. To eat immediately upon entering on a life and death struggle would be fatal if the contestants were otherwise equal, hence now we feel not only no appetite but nausea when on the ragged edge of acute danger. Excrementation lightened the body and made it more agile. The more finished products of the later stages of digestion, on the other hand, would be chiefly and immediately serviceable, so that heart and lung action and also blood pressure would be augmented to their maximum, perhaps to the point of lesion, while the primary grosser digestive activities, which would divert energy, were suspended. The most urgent call for the most instant activity would, however, come to the nervous system, for to it falls the greatest and most important task of selecting, coördinating and innervating the most advantageous movements best adjusted to the clearest perception of all the pertinent factors of the situation. How inadequate this, its work, is in cases of shock we see in many of the phenomena above wherein obsolete motor patterns are more or less activated, harmful though they now are. Especially in neurotics these may come to absorb most of the energy needed for rational responses, and synapses that should be impervious are broken through. Hence shock has strange power to initiate the most diverse neuroses and psychoses, all of which if they could be adequately analyzed psychogenetically, would be found to be reversions to, and also perhaps more often than we suspect, actual magnifi-

cations of acts and psychic states that were at one time the fittest of which our forbears were capable. But again we see here as so often elsewhere that it would be unjust to primitive man and his ancestors to assume that all such pathological phenomena of today are mere revivals of his states and acts. They are often, on the other hand, grotesque variants and intensifications of phylogenetic originals that were more sane and simple if also more generic. Shock symptoms may thus be symbols of long past racial experiences which when we have learned to interpret them more fully will tell us much of the early history of our phylum.

Now not only does every shock leave its own fear behind it but no fear is more universal in all forms and stages of life than that of shock. Many of the most remarkable instincts of animals, such as the posting of sentinels, wariness, forms of shelter, were developed to avoid the surprise of being caught unawares. Apprehensiveness has its own *Einstellung* or mental set which normally mitigates shock effects by expectant attention, that seems to be able to open and facilitate the ways to adaptive and increase the resistance to unfit modes of response. Although the *Einstellung* is itself more generic and indefinite than the shock it anticipates, it makes us ready to a degree which is the inverse of its generality for the more specific shock experience when it comes. In neurotics, however, this fore-feeling of shock may be as vivid and explicit as the shock itself, and particularly in hystericals, about one-fifth of the cases of which are traumatic in origin, it often seems to be even more so. How comes it then, that phlegmatic and lymphatic temperaments, hibernating animals and human foetuses, which may survive the amputation of all four limbs, endure so much graver surgical shock than can civilized man? Is it because their cerebral centers, being less highly developed, are themselves more immune to lesions, or because the strain of expectancy is reduced? If the chief factor in shock is of neuropsychic origin, it would seem that *Einstellung* would increase and not decrease its deleterious effects. Perhaps the explanation must be sought along the following line. Most if not all anaesthetics as well as narcotics and hypnotizations do not obliterate consciousness but retract it from present reality to an intensified dream-revery, from which even a severe operation does not awaken us. Under its influence, then, we are not mindless but only intensely preoccupied or distracted, so that the pain is unnoticed and so not reacted on. On the same principle wounds are not felt in the excitement of battle or, as many records show, when men are

being torn by beasts of prey. The lower automatic responses may go on and the victim may groan, feel nausea, void excrement, flush and grow pale, circulation and respiration may be modified, much as if the pain had really entered the centers of normal consciousness, although perhaps even the voluntary muscles are paralyzed. Why, then, does not man tend to meet all sudden strong pains of life by the method of diversion from rather than that of the clearest envisagement? Why not put all thought of anticipated shocks and pains out of mind and perhaps deny their existence instead of striving to get them into the very fovea of apperception before they occur and even while they last? The former more often goes with the method of passive fatalistic resignation and quietism which accepts the inevitable, and the latter is that of revolt or at least intensive quest of ways of escape. By one way we tend to be masters and by the other victims although we must reverse the Freudian derivation, which makes this distinction originate in that between Sadism and Masochism instead of regarding the latter as secondary, as we must. One affirms and the other negates the will to live. Each has its psychology, its philosophy, and its religion. One accepts illness, death, and even annihilation without resistance, while the other passionately posits life here and even hereafter.

Humboldt says that the shock of earthquake is not at root the noises, human suffering, destruction of property, but the sudden reversal of the age-long sense that the solid earth is immovable. The victims of the "Titanic" accepted the prospect of death with composure till its fatal plunge into the cold water, which brought the automatic struggles and shrieks which were beyond control. Earthquakes, pestilences like the "Black Death," which between 1348 and 1350 slew one-fourth the population of Europe, brought unprecedented despair and abandonment of all moral, social and religious restraints, and even decency, set free about every bestial passion, lust, murder, debauchery, etc., yet there were those who, facing this most painful and disgusting form of death for themselves with equanimity, were not only faithful to the end in their ministrations, but were able to use their reason coldly in describing the malady and its effects and in striving to grasp its cause and cure. Much of the entire history of civilization, custom and religion, and indeed of progress generally might be written in terms of the decrement of the element of shock, although while we are learning to mitigate old we are causing many new forms by way of accidents. The conception of the world as a cosmos instead of chaos, of every event

as a link in an endless chain of cause and effect, the growth of foresight, prevention, insurance, training to meet emergencies, has been the work of those who faced and disarmed shock and its horrid cortege of fears. This at least is one of the psychic causes of bravery and courage, the touchstone and reward of presence instead of absence of mind which gives power and self-control in emergencies.

It must therefore have a deep genetic root, and if so what is it? For answer we must recall the law of ambivalence. Along with their fear of it virile man and his ancestors always loved shock. He has been an adventurer, a plunger, courting the chance of it, and this has been one of the spurs of curiosity and enterprise and constitutes a part of the charm of novelty and its opposite—the tedium of wont and routine. By his quest of change and hazard in its many forms man both tempers and tests his mettle for each bane prompts him to find an antidote and each toxin an antitoxin. By this process man feels himself, summates his powers, focuses and unifies all the factors of his personality, abandoning for the nonce all motives of caution and prudence for the fascination of danger, alternating between them, and, in protracted periods of each, accumulating incentive for the other. Thus we have here the law of combination of attraction and repulsion, neither ever absent but each alternately predominating, much as appears in the antithesis between sex impulsion repressed by modesty, convention and morality, with its lure of the risqué.

Only geneticism can explain the above paradox. As life has evolved on the psychic plane, the preservation of life against all great and sudden injuries is less by the vegetative power of recuperation and more in the cerebral function of pre-perceiving and so preventing shock. Instead of the power of regenerating mutilated tissue or even lost limbs and sense organs by the *vis reparatrix* of re-growth, men, especially those well endowed with brain and mind, depend increasingly for survival upon their keenness of perception and their foreknowledge of coming harm, which enables them to escape it. Once continued existence depended upon the degree of injury which could be made good by re-growth, and in lower races and still more in animals we find almost incredible restorations. This power was of course of the very highest value in the conservation of the race, comparable with and perhaps even more marvelous than the achievements of modern antiseptic surgery. This old regenerative power is now less needed and so less developed in the recent racial experience

of highly evolved man because he is more able to protect himself from grave injury by having learned to fear aright, *i. e.*, preventively. With evolution also goes the fact that the number and gravity of psychic more and more preponderate over that of physical shocks and traumata. Forcible coition too once involved violence and perhaps physiological injury, while now the moral and social damage comes to the fore. In view of all this no wonder that meddlesome men have a strange proclivity to exercise these new powers and to put them to the test, to let themselves out, to court danger, to owe their integrity of body to superior knowledge and not to mere restorative growth. Yet we must understand that the latter was a genetic fore-school for the former. If primitive man had not had a high degree of disvulnerability or recuperative power he would have been today less brave, if trivial accidents had killed he would hardly have survived at all, and what is more important, he would not have profited by the wisdom and caution which his daring danger and hardship brought him. Moreover primitive medicine, we are now learning, was not so ineffective for those who practised it as was once thought, and also, however little or great its value, the fact that its devotees had such faith in it made them brave. So, too, did every form and degree of a belief in a future life, in which courage is always rewarded. Thus as the operations and accidents that the cave man survived attest his vitality, as also do the unhygienic conditions which he survived, his faith in the arts of his medicine men and his certainty of another life were resources that bred a diathesis of courage which we inherit in our instinct to take large risks, gamble with fortune and dare the heaviest blows of fate. Our ventures are with the more impalpable dangers of loss of fortune, good name, social or moral calamity, and our trust is in the foresight that escapes and we think less perhaps of rehabilitation in case of defeat. "Nothing venture, nothing have" expresses a deep instinct that has thus a venerable pedigree and that is the best of all antidotes of fear.

Many mental and neural diseases are caused by shock of many kinds. Of over 6,000 cases of insanity it was lately estimated that about 5 per cent. were due to shock, while of hysteria Freudians think it the only cause. It may bring on amnesia, hysteria, and even amentia. It may cause abrupt changes of character as well as of health, and it is a fertile mother of phobias. Its injurious are more studied than its curative effects although the latter are undoubted. An insult that causes a sudden explosion of rage, threats and abrupt

frights, flagellations, earthquakes, a pail of water dashed over a patient, a fire or other sudden danger, news of a death, injury or accident—all these have many surprising cures to their credit, discredited as this method of therapy now is despite its tonic effects. Any sudden and intense emotion may have great transforming power upon thought and life. The consciousness of being in love may come as a sudden shock, energizing and intensifying everything, and being almost as revolutionary as was the old instantaneous conversion; so may rage and hate, jealousy, etc. Habitual consciousness may be evicted by an eruption from the unconscious regions of the soul and a new personality, either better or worse, may come to the fore, for since Kerkengard we have striking conversions from a good to an evil life as well as conversely. All such phenomena the old theories of possession made objects of awe if not of fear. Reason always fears emotion and is shocked by its outbreaks, and well it may be, for they mark the incursions of the race into the narrow life of the individual. It is this dread that has evolved a vast array of regulative apparatus, from rules of etiquette, the morals of passional control, criminal law, and above all religion, which is man's supremest device for the regimentation of his feelings. When they break out riotously in the individual or in the mob they may in a moment wreak a havoc that nothing can make good. Hence it is our own emotional possibilities rather than the moral law, as Kant thought, before which we stand in supremest awe. Their sublimation, directly or indirectly, is almost the whole work of culture. In this sense the fear of self is the beginning of wisdom. Every supernatural object or personality is the creation of these feelings. All of them we fear but only secondarily for the fear in which they all root is that of self.[2]

[2] One of the chief dangers of grave surgical operations is shock, due to the great exhaustion caused by the dread and fear which the patient feels for the operation in advance, and the traumatic effects due to the laceration of tissue. In other words there is first the anticipation and second the injury itself. These together pump out the stored up energies of the brain and bring extreme exhaustion, which often issues in death. Both these dangers have been greatly mitigated by the method of Dr. Crile, the enthusiastic advocates of which make it a discovery equal to that of anaesthetics and aseptic methods. To obviate the preliminary dread so that the patient shall not know when the operation is to take place, he is given on several days a slight anaesthetic which he is told is to facilitate preliminary examinations, but when the day arrives he is given, unbeknown to himself, a stronger dose usually of morphine and scopolamine to kill fear, which does this by its marvelous power of preventing asso-

Perhaps the most important component of the impulse to defy and quell fear is found in the domain of sex. Many forms of animal and human courtship involve valor, risk, prowess in conflict, and victory always charms, thrills and often wins the female. The hero who overcomes his foes more easily overcomes all her resistances and her defences weaken and grow less reliable in the contemplation of great deeds of vigorous and valorous males. Her sense of security in her own virtue is a trifle shaken in the presence of tokens of resistless masterfulness, and such manifestations ally themselves of course with, if they do not fan, her desires. The male who overcomes others could more easily overcome her, and the more aggressive the courtship the less her fault if she succumbs. Such a partner, too, can protect and provide for her during the helplessness of pregnancy and lactation. On the other hand through measureless ages the male has come to associate victory and lust, whether in the conflict of rivals for the boon of her favor, in the forays of exogamous tribes or in the orgies and rapes that follow the victories of armies, when all the accumulated energies of passion are let loose. Thus hardship and danger have been inveterately associated with sex indulgence. It is for the advantage of the

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ciation. A patient thus doped has not the slightest apprehension about what is to happen so that all danger of psychic shock has disappeared. The traumatic shock still remains and this is affected by a local anaesthetic such as cocaine or novacaine, which entirely destroys sensation in the parts to which they are applied by paralyzing the nerves so that they can transmit neither fear nor motion, so that radical and prolonged operations can be performed without deteriorating effects upon the brain. Thus the other terror of modern surgery, viz., the exhaustion that follows an operation, is greatly reduced if not almost eliminated. Under this anoci-association the number of deaths which in one large hospital under the old method was a little over six per thousand is reduced to less than one in a thousand. Crile's discovery is based on his phyletic theory that the brain developed its power of accumulating energy in the old war of all against all in the struggle for food and procreation. The brain was thus made a great storehouse of energy, which is as real as steam power. Noci-septors are like push-buttons placed in those parts of the body most liable to injury and thus to need an influx of energy from the brain. Tickling, for instance, is a form of shock which is very exhausting because spasms were once life preservers. As brain energy is exhausted and when the hemispheres become like dead batteries man dies. Emotions produce the same mechanical trouble in the brain as does physical injury, and in old times fear was the chief disturber. A man on an operating table was very like our jungle-prowling progenitors in the grip of some tearing, rending monster, so far as its effects on the brain are concerned until anaesthetics.

species that acute jeopardy to the individual should ally itself with the racial instinct of propagation. The brave not only deserve but win the fair and thus their quality is transmitted to posterity. The young savage brave cannot marry until he has staked his life in some way. Thus threatened negation of the individual is compensated by affirmation of the species. Hence even Sadistic impulses are the sequel and not, as Freudians assert, the antecedent of aggressiveness against others. This, too, is the order of development in childhood where, as always, the general precedes the special. The highest daring, then the highest pleasure, for individuality thus best documents itself as worthy of fruition. The charm of such ancestral rewards is no doubt inherited as an impulsion in the prepubescent boy to do or dare, but it appears in him only as a blind instinct with no awareness of its goal and with no glimmer of a sense that to take shocks that imperil personal existence means that in nature the race is always true to itself though reckless of the individual and at the latter's expense.

Finally, modern psychiatry is coming to assign to shock the chief rôle in nearly all psychoses and neuroses. On this view an intense, sudden, painful experience, especially if the significance of it can be dimly felt but not understood, may persist long and latently unassimilated by the central consciousness and without fusion with it, almost as if it were a foreign body in the psychic system. Such an experience may become the nucleus of a complex which without being recognized may grow into a dominant factor in the victim's life and become a parasitic or secondary personality. When it manifests itself in acts, ideas, dreams, wishes or otherwise it is usually so transformed that only analysis can interpret its real meaning. Not only the original fission itself but all the modifications that follow are products of fear, the first of shock, the last the dread of an internal censor. Freudians hold that most such experiences lie in the sphere of sex. A child who sees a sex act or anything else which shame usually conceals; a girl whose trusted and respected lover suddenly makes indecent advances; even a two- or three-year-old boy in whose presence a maid servant partially exposed her person; those who have experienced sudden acts of sex aggression; even the sudden but belated knowledge of how babies come to exist, if it comes in a coarse way;—these illustrate Freudian shocks as they manifest themselves at once or long afterwards by obsessions, complexes, motor, digestive or other symptoms and which may burrow into the psychophysic region of the organism, affecting conduct, mentation, dreams, etc., because such

experiences cannot at once be faced and digested by consciousness, so that reaction to them is excessive or perverse. In such cases normal conscious reactions are supplemented and perhaps supplanted by those that are unconscious, instinctive or spontaneous. The first knowledge of the origin of human life may cause a shock. So may later first menstruation, spontaneous emissions, with sudden experience of the extremes of tension and relaxation, which is often extreme near the dawn of puberty. Then there is parturition, the instant shattering of love's idol, even the instant of awakening to the consciousness of a love which has been silently growing strong without awareness, the strain and excitement of being married, the revelations of the honeymoon, the care of establishing a new home, perhaps the sudden realization of the falsity of one party by the other:—these common experiences show that the *via vitæ sexualis* is a rough road to travel with many jolts in it, each of which has its host of victims. Thus it is no wonder that those who achieve the stormy voyage from adolescence to senescence sometimes feel, as the psychology of old age shows, that they have glided out of tempestuous seas into landlocked, calm, still waters, and that the philosophic quietude which writers from Aristotle and Cicero down thought a fit characteristic of this stage of life, is within their reach. Fears always troop about love and die with its death. Even more than in childhood individuality can affirm itself and is emancipated from the vaster interests of the race. The shock of conflict between the two abates. So long as the ego is freighted with the greater burden of the species there is incessant internecine war between the two, victory alternating from one side to the other, now one, now the other suffering defeat, physical, mental, moral, and our asylums, courts, and far more lives outside them, show the wreckage and debris of this struggle. Hence the theory that finds in shocks in this domain of life the chief cause of psychic disintegration and seeks to trace the connection between specific causes, and their effects merits today the greatest attention and respect, and every danger here has its own unique fear. (See more detailed treatment of this theme in the chapter on Sex-Love.)

In the past shock has perhaps done its most transforming work in this sphere of religion. From the Shamans, witch-doctors, medicine men, Dionysiac and Eleusinian mysteries down to recent revivalistic methods of conversion, shock has been an essential if not central agent of psychic metamorphosis. Apparitions of the dead, blood-curdling ghosts, dread Maskim,

furies, gods and demi-gods, startling miracles that broke the order of nature, rapt, ecstatic, visionary states, trances and seizures, that broke the continuity of psychic life typified by often very elaborate symbols of death and re-birth:—all these represent supposed eruptions of an alien supernal power, suspending or breaking the sequence of natural law. Such things have always been the chief recourse of priestcraft and have often marked the submergence of the old and the rise of a new personality. Revolution took the place of evolution and saltatory has gone along with gradual development. In all this fear has been the chief motive appealed to. The sacrifice offered by worshippers means "*do ut abias,*" "I bring oblations to ye awful and unknown powers that ye may go away." So strong is our hereditary proclivity to experience religion spasmodically that it will be very long before the great transition from a life of selfishness and egoism to that of service and altruism will cease to be attended by convulsive symptoms because the idea of conquest by an alien power seems easier to grasp than that of normal growth, and perhaps hell and devils and all their awful kin will never cease to be horrid fear fetiches.

Thus we see that shock-fear has played an immense rôle at all stages in the development of animal and human life. It has given to creatures preyed upon the power to summate all their available energies in quick modes of escape and this power their enemies had to emulate. It has given man his power of second breath and general erethism and thus equipped him for meeting great emergencies. It has given him whatever spurty diathesis he has and made his progress upward not always that of the turtle but of the grasshopper. Even summital moments when epoch-making decisions are made or when inspiration comes or great thoughts and deeds evolve, all this is because fate has dealt out experience to man and his ancestors in a lumpy, bunchy way, to which his organism has grown wonted to respond. Hence it is that if his environment is too long monotonous, periods of excitement in which he breaks out now arise by an inner because they have had to so inveterately arise by an outer necessity. Thus we may cut loose, maximize all our powers, without any adequate or instant provocation. Thus our life is punctuated with alternations between drifting with the tide and rowing with might and main either with or against it, as the domestic horse now often cavorts and runs away in frantic terror perhaps from the most trivial cause, all because this psychic diathesis was stamped upon his stirp from the time

he was a timorous, fugitive, rabbit-sized creature on to the present time. His timid, panicky disposition is due to the long ages when he was the victim and perhaps the chief food of wolves and other beasts of prey now extinct, when he was exposed to fires on prairies and steppes, and during the many thousand years when he was the chief quarry of the Loess hunters (a single tract of five or six acres near Solutré being covered with their remains, in some places " nearly seven feet thick " or " heaped in enormous piles." Buttel-Reepen, " Man and His Forerunners," 1913, pp. 96). As it was in this long apprenticeship to fear that the horse acquired his racing powers, which were also fear-made, so man in the far-back curriculum of his race developed the propensity to have excessive outbreaks of activity and woman grew prone to brainstorms of affectivity, and today many forms of convulsive seizures are derelict and distorted vestiges of the tempo and rhythm with which our ancestors reacted to types of experience which have now more or less ceased to exist although their cadence still remains in the soul. Here thus as in most strong manifestations of emotion there is an anachronistic element. We fear with not only all that we, but with all that the race has feared.

The same is true of man collectively. In panics, theatre-fires, shipwreck, earthquakes, tornadoes, as well as those that arise in business, social, political life, as Le Bon's psychology of the mob shows, feeling is immensely intensified in gregarious man by contagion, and if with Baldwin we accept social inheritance back of all tradition, we must again have final recourse to man's genetic history. For ages, compared with which the historic period is but some two seconds, on Haeckel's cosmic clock that measures the cosmic day as twenty-four hours, the savage tribes from which men sprung were exposed to conditions that compelled them often to suddenly leave their homes, perhaps after decimation and near extinction by their enemies, to migrate far and long and after hardships and dangers begin all over again, adjusting to a new environment, with only a remnant of all that they once were and possessed. They were often led captive, enslaved, almost exterminated, robbed of property, wives, children, liberty, their very rights, traditions, and folk-lore largely lost, so that those who survived had only too good reason to fear all the worst that can befall man. Primitive tribes have always been wolves to rival tribes. The very tradition of these brutal ages has perished, happily for man's self-respect but unhappily for our knowledge of his genetic history. Instead of not being able

to think too highly of himself, as Hegel said man could not do, it is hard for it to enter his heart to think too meanly of his ancestors, in the forgotten ages of the relentless war *à l'outrance* of all against all. Only when the secrets of this lost record are revealed can we understand the ultimate reason why even civilized man after long periods of settled and orderly existence is liable to spells of upheaval and revolt against existing institutions, economic, social, political, religious. It is the call of the wild tribesmen in him to break away, renounce, demolish, burn what he worshipped and worship what he burned, strip off all convention, and try with abandon to get back to his original nature and start afresh. Hence the chronic fear which all who possess and would conserve have for levelling nihilistic spirits that would make a *tabula rasa,* as man in the past has so often done. Thus man is not very securely established in the settled orderly ways of modern civilization, and deep in his heart he knows that it may pass away as did the older types of classic days, and new races, perhaps now as rude as were the Teutons in the days of Tacitus, take up the torch when it falls from the exhausted hands of those who now carry it and bear it on to still greater heights yet undreamed of. Moreover there is always the possibility that society may turn turtle, topsey-turvy-wise, the first becoming last and the lowest highest. Thus beneath all our vociferous confidence in both the stability and the optimal character of things as they are, there is always an ambivalent and more or less unconscious fear that they may all be reversed. Only in the daily fluctuations of the stock market quotations have we any adequate registration of alternating fears and hopes pertaining to a very special aspect of communal life, but the same delicate oscillations are always going on in every field in which man has created worths and values, and the vicissitudes of his racial history contribute a factor to all such hovering oscillations between confidence and distrust concerning everything that is most prized.

(II.) *Pavor nocturnus,* on which a voluminous literature has accumulated during the last twenty-five years, is of great interest to geneticism. It is most common between the ages of two or three and seven or eight years, although it may occur earlier and may follow puberty. The child wakes suddenly from a deep sleep, pale, or more often flushed, with perspiration, throbbing heart, cries of terror, eyes fixed as if on some imaginary object, or rolling wildly, in search of the cause of its fear, and muscles tense, perhaps almost convulsed. It rarely occurs at the beginning of sleep but in the early part of

the night when sleep should be deep. It is rarely repeated the same night but there may be increasing nervous tension for a series of days or even weeks, culminating in an attack. The words uttered are very often incoherent and unintelligible. The arms are often thrust out as if in defense. The whole attack lasts perhaps from ten to thirty minutes before the child is fully awakened and soothed. It can rarely tell much of what it feared, if indeed it usually has a specific object of fear. It falls asleep again, tired out, and in the morning has very commonly forgotten all about it. The fact that it comes on after deep sleep has set in, distinguishes it from the starts that may come to us all in the sudden falling to sleep, yet the two groups of phenomena may be akin. Beyrand thinks that the dreams are more often of animals, big and small, and next of attacks by other children or by adults, and that they tend to re-occur at the same hour on different nights. Hypnophobia may result. Some ally it to epilepsy, eclampsia and eclipsis. Braun insists on a neurasthenic basis and thinks it is most common with a high degree of irritability. For Rey (on a basis of thirty-two cases) stoppage of air-passages by bedclothes or adenoids plays the chief rôle. Freudians ally it to sex orgasm. Steiner, Werthauser and Henoch think it a true disease, while West, Ringer and Souchut deem it a reflex. Seelacher (17 cases) thinks it most often due to bad blood and anemia, although constipation and dentition are factors. Boncour thinks symptoms of meningitis are very common and deems its attacks very grave although they come to the knowledge of the physician for the most part incidentally. Little even describes cases of *pavor diurnus,* Soltman thinks optical hyperasthesia a prominent cause, although he emphasizes education, heredity and chronic disease. Worms, alcohol given as medicine or taken by the mother or nurse, chlorosis, chorea, anxiety, indigestion, and many other factors have played rôles in etiological theories. Goodhart (37 cases) deems it a nightmare, although Coutts thinks the latter a reflex, while *pavor* is of central nervous origin. Incontinence and somnambulism often go with it. As to whether it is of somatic origin, according to the Lange-James theory, or ideopathic, *i. e.,* due to dream hallucination, or delirium, Silvermann wisely concludes that these theories represent two forms, both of which may occur, and thinks the day has passed when we can assign it to any one cause, organ, or function. The literature shows that it may at least co-exist with more and more types of disease. The child's general condition and degree of fatigue may have much to do with it, so that an

experienced observer can often forecast its onset, and bad physical conditions of any kind may not only precede but follow an attack. It has even been said that *pavor nocturnus* is highly generalized because an infantile form of insanity.

In this chaos of description of cases and partial theories it is difficult to attain any unitary conception of this syndrome, and there is even yet, on the whole, more divergence than convergence of views. If the facts in this fascinating field can ever be correlated we must have a theory of sleep and must consider the relation of these phenomena to man's phylogeny, to both of which clinical medicine is at present strangely indifferent. Here it is at least certain that the explanation must be sought although in the present state of our knowledge this must remain far from complete. Sleep, whatever else it is, begins in a retirement from reality, in Janet's sense, to what Bleuler calls the autistic level. Its normal progress is on down the phylogenetic levels. Hypnagogic phenomena are vestiges of ancestral types of mentation. Old tendencies, repressed in waking, are set free. We indulge old and perhaps infantile wishes and propensities. Sleep is thus as devolutionary as is true Jacksonian epilepsy. As the higher levels successively fall asleep the inhibitions which they always exercise when alert upon the next lower levels are removed. Only the lower centers, digestive, circulatory, respiratory, never sleep. In going to sleep, then, there is a lapse in the direction of embryonic conditions, which infants tend to assume even in posture. Going to sleep is thus a very complex process, taking, according to some studies, over an hour to reach its highest degree, even after the subject seems to others asleep. Ideally we can conceive it as a glide down an inclined plane, across many evolutionary strata, and it is a long glide from maximal alertness to the most complete slumber, the highest and latest acquired functions going first and the more primitive last, as far down as the "diurnal function" extends. Morals, propriety, all the restraints of the environment, are lost with the eclipse of the senses, and the sleeper becomes an automaton, the vegetative functions of life predominating. Thus the sanest, wisest, best, may yield for a time to the most insane, bad, foolish impulsions, on the way to or from complete sleep. Instead of going to sleep ideally, however, there are usually one or more drops, as if we were going down steps or a ladder, or falling across lost stages, instead of sliding down a smooth plane. There are perhaps abrupt changes of association; waking channels are closed and others opened suddenly; new balances between innervation

and inhibition are abruptly struck. In this way the effect of ancestral experiences, usually kept down by many old restraints, is set free. Propensities that have long slumbered in the unconscious regions of the soul break out, perhaps with almost fulminating intensity. Sometimes the very strongest and worst of these eruptions bring momentary pleasure that the censor that watches even dreams and is so hard to escape is circumvented by many an intricate mechanism devised for that purpose.

How, then, can we explain these shocks, starts, spasms, and the fears they inculcate? To this end we must realize that normal sleep is a product of long and painful evolution. Some, if not most, of man's forbears, like many existing apes, may have been at least semi-nocturnal in their habits. In unprotected primitive man the habit of long, sound sleep would have been dangerous, exposed as he was to animal and human foes, so that safety would require promptness in waking for efficient defense. Night, too, was peopled with imaginary objects of dread, that since science, which means prevision, did not exist, and laws of nature were unknown, gave a feeling that almost anything might happen at any time. Hence sleep must have been with reservations, as it were, as a nurse sleeps, or on arms, rather than with abandon. Man slept as we do now when expecting calls to awake. His mind was attuned to respond quickly to danger signals. In the open, weather changes of various kinds would perturb sleep. In the hunting stage real and perhaps dreamed of wild beasts that prowl by night, in the pastoral stage dangers to flocks, if surrounded by human foes, perils of ambush or night attacks, could not fail to lessen its intensity and often interrupt sleep. Night was the most dangerous, instead of being, as it is in our sheltered condition, the safest time. Sudden alarm in darkness meant intense, wild, defensive movements, for danger that might be mortal was imminent, but in the darkness with no knowledge of what or where it was. This condition is exquisitely reproduced in typical cases of *pavor nocturnus,* in which such old alarms seem to re-echo. The blind, aimless struggles and screams for help, represent the way in which our forbears responded to night alarms. In the victim of night terrors this mechanism is not entirely obliterated. His acts are the auto-kineses of fear, while the dread fancies connected with them are far more polymorphic than the movements. Perhaps indeed the psychic factor is secondary or absent, although low level shocks of themselves have great power to start up the psychosis of fear. Thus very likely

those who think that *pavor* may develop on the basis of infantile convulsions are right. The earliest, most generic forms of convulsibility would hardly have a psychogenetic root unless it be in the form of long-forgotten racial experiences. Motor are far more prominent and older than psychic expressions of fear. Even the starts, so common as we begin to fall asleep, may best be interpreted as rudiments of defense from which the psychic elements have more or less completely vanished. The Lange-James theory may hold for the race but not for the individual, psychic fears having made the mechanisms, which far outlast them. We cannot too often realize that the environment has created man, that he is nothing but a complex set of records of the past of his stirp, which have been stored within him, and that of all these records motor patterns are the most important or persistent, whether they were shaped through the ages by distance or by contact septors. The neurotic child, on lying down and going to sleep, breathes superficially; his blood is insufficiently oxidized, and he starts up with symptoms of dyspnoea, when, or as Little thinks, just before, his sleep has reached its deepest state. In some cases, *pavor* seems to have an aura, and this may have varied forms. The occasional cause of its onset may come from within or without. The dread of bed and sleep is so great that the child is unable to sleep without a trusted companion nearby. The nervous child may drop off very suddenly and very deeply. The deeper forms of *pavor nocturnus* seem to occur when sleep has gone below the level where the conditions for dream formation are most favorable. We usually dream in rather the earlier stages of falling asleep or the latest stages of awaking, so that it is a characteristic of the transition stage to and from true and deep sleep. Motor patterns, especially the older and ancestral ones, lie below this level, and individual experience determines only the height of the level at which these patterns are actuated. In *pavor* we have to do with an older complex which is like a rudimentary organ which has not been differentiated, as it normally should have been, into more specific ones, like *e. g.*, gill slits that may persist in the foetus till and even after birth instead of being made over into those portions of the eye, middle ear, larynx and thyroid, which they later help to constitute. It is thus these old motor patterns, beginning perhaps in infantile convulsions, and then passing into *pavor nocturnus,* and later into nightmare, epilepsies, and the host of other shock disorders, which Groenninger and others have attempted to correlate as a peculiar diathesis. Children normally awake slowly

from lower to higher levels, and if this sequence is inverted, as it is by a sudden outer stimulus, and especially if this experience be repeated and a given level is often awakened by the one above instead of that below it, we should have shock during the ascending series of states of awakening, or perhaps a summative series of shocks from above downward, so that the waking series would occur in an order inverse that of the normal. Hence the sudden arousing of children favors *pavor* symptoms. Sleep does not very long persist at its greatest depth, but, as experimental studies show, grows less through a number of the later hours of the night, so that in this sense we may be said normally to require hours in which to awake, while usually only from one to two hours are necessary for sleep to attain its maximal depth. In other words, the curve of falling to sleep is steeper than that of awaking from it. To awake suddenly causes a shock a little like that of being reborn or thrust without warning into a new world where all is strange, and every shock and start, the faintest as well as the most violent and convulsive, is partial awakening. The closing in, downward process of sleep is not only arrested but reversed so that in neurotic states the descent into the valley of Morpheus is not a steady slide but more like that down scenic railroads in "White Cities," with many plunges and rises which respectively increase and diminish momentum, while waking, on the other hand, is a slower progress up the same road. Two traits often specified in the literature of *pavor nocturnus* are that its victims are prone to be precocious or retarded in their mental development and also to be of an affectionate or clinging disposition. Both are significant, the latter because *pavor* is at the same time both cause and effect of a passive temperament. It goes with timidity and lack of self-confidence, and it has been suggested that a reiterated experience of such seizures by their own automata predisposes to fancies of being seized by others, and may become the *Anlage* of fictive tales of being robbed, bound, ravished, and of a Masochistic disposition generally. As to precocious and arrested children, if falling to sleep reverses in any sense the course of ontogenetic or phylogenetic development, while waking rapidly repeats the salient features in the life of the individual, the race, or both, it follows that any obstruction or undue facilitization of the *élan vital* into the stages of descent into and ascent from the valley of sleep, would be deleterious, and that both ways would need special safeguards, on the importance of which pedagogues and paedologists have for generations laid the very greatest stress.

Again somatogenetic confirms and ideogenetic *pavor* confutes the Lange-James theory, for in the latter the dream causes the convulsive movements, and not the reverse.

Primitive man lacked foresight, knew little of the laws of nature, was unprepared for emergencies and so was exposed to the unexpected, to surprise, dreaded the new, and above all was liable to supernatural terrors, also to attack from real and fancied enemies, human and animal, as well as to dreadful monsters created by his own imagination, was spied on, ambushed, sprung at, appalled by tropical lightning and crushing thunder and long and doubtful struggles with great beasts of prey to see who should be lord of creation, must often stake his life, if not that of his tribe, against that of human foes, was the victim of countless accidents against which civilization has learned to protect us, might have instant calls to do his uttermost and use all his reserve power to escape or resist. The wager of battle was a hand to hand conflict, in which his every sense of muscular strength, skill, quickness, endurance, was put to the severest test. Have all these accumulated experiences left no trace upon us as descendants? Can we suppose that, had man and his predecessors always lived sheltered lives, with no sudden alarms, he would today have been as predisposed to convulsible states, sleeping or waking? Is it not rather the part of common sense to conclude that all experiences like the above constitute together the chief factor in man's *Anlage* of response to all explosive states and brainstorms, and that from the spasms of childhood and man's starts on falling to sleep to nightmare, night terror and epilepsy, and all the other shock neuroses and psychoses, there was thus some preformation in our constitution, and that indigestion, smotheration, fatigue, and all the other exciting causes are only occasions which set off a long pre-existing and inherited mechanism, least compensated for in neurotics and in victims of defective inheritance, and that the form which the outbreak takes is an accident of age, individual, or more recently ancestral, experience, or the order in which the repression exercised by the higher centers, is removed, or which of them is remiss either in sleep or in devolutional diseases.

In the large and heterogeneous class of convulsive diseases there seem enough similarities to warrant us in grouping them together, as ought to be done from the genetic standpoint. Steps toward defining a larger generic conception of epilepsy have already been taken by Davenport and Weeks, while Rosanoff and Orr in their study of Mendelian heredity in the

endogenous cases of 72 families with 1,007 offspring took another important step in this direction. These and a few other similar studies so far made indicate that at least many diseases can be traced back to some very generalized form, as can many animal species that have gone far on the way of differentiation. Such morbid symptom groups must be traceable to the lack of some factor or the loss of one of the many unit characters or determinants. Paroxysmal spasmodic traits of disease, of which we have taken *pavor nocturnus* as a paradigm, we may conceive originated in the sudden extrinsic calls upon organisms to act with the greatest promptness and energy. This would of course at first tend to speedy and great exhaustion. The power to act thus, however, was of very great selective value, and so the power to store and suddenly discharge energy ensured the survival of those who could do it. At first only external influences caused these detonations such as urgent necessities for flight or fighting, to resist rape, robbery, or other forms of attack, and all the movements involved were at first purposive. Again, the stimulus to these intense reactions might be slow and cumulative, so slight as to be unconscious and produce no response for a long time while motor energy was slowly accumulating, till at last a crisis of reaction came which changed the environment. If the outer evocation to act was too great or too frequent, the individual would suffer exhaustion and collapse. If on the other hand the outer provocation did not come, the accumulated surplus energy held in reserve would at a certain point of high tension be set free by endogenous stimuli. Thus the convulsive phenomena of *pavor,* epilepsy and perhaps the more specific affections like trismus, tetany, Thompson's disease, chorea, tics, and the rest would gradually come to be set off in a genetically secondary way by unusual stimuli within the body instead of, as at first, without it, especially from exceptional impressions arising from the digestive, circulatory and respiratory tracts, and many others, prominent among which are sensory, nervous and psychic excitants. If the results of all these drastic ancestral experiences be not entirely lost it would seem that some of them would be found to be co-factors in a large class of hyperkineses, and that many of the motor patterns we glimpse here must be regarded as scars of ancient fears made when the great and fundamental emotions were far more intense and formative than they are now. We start perhaps automatically now because our ancestors were convulsed by terrors. We

shudder or experience a shock and then feel fear while of old the feeling of fear was primal and created the physiological forms of its expressions, most of which are now worn down and rather purposeless relics of what were once far more definite and effective. Fear made mechanisms and then retreated as it could do because it had done its work so well. The phylogenetic order was first the great primal fear, moulding plastic functions and even protective organs to its service. Then, having greatly enhanced safety, the fear ebbed. Third, a changed environment made the old types of defense obsolete, but they persist, in a sthenic if somewhat now incoordinated way, and when they are called into action now they evoke a faint phosphoresence of the old primordial feeling. This later stage, and it only, conforms to the Lange-James rubric. The old motor patterns which pristine fears once made and used, which have such great power of persistence in us all, but especially in neurotics and children, worn and rusty though they be, can still arouse to a degree the yet older feelings that originally fashioned them, and although their defensive value has long since passed away and they are often impediments, they remain interesting though confusing vestiges of a time when our forbears were in palpitating touch with a rugged fear-provoking environment which has now for the most part passed away.

Thus fear is phyletic flight or defense. No matter how refined we are, we fear in the same terms of the same old gross organs and functions as do the brutes. We fear in the heart, the lungs, the skeletal muscles, the brain, kidneys, stomach, and sweat because this was once necessary in order to regulate the temperature in violent effort. We breathe fast and deep because rapid oxygenation was necessary. Thyroid action increases in order to accelerate metabolism; the adrenals act to augment blood pressure. Glycogen, of which the liver always has a modicum ready for use, is consumed the most rapidly because it is the most available nutritive element, while on the other hand, the digestive and procreative systems are reduced if not positively inhibited in their function because in the intense activities of fight and flight they were *hors de combat* and could not add to the efficiency of the moment. Fear does, however, strongly tend to empty the alimentary tract, decreasing body weight and perhaps increasing agility thereby. Only those functions in which there was no instant help are checked, and all others are toned up to their highest pitch. We clench fists and teeth because our predecessors

clawed and bit, and we have the tensing-up phenomena of heart, lungs, muscles, because all these phenomena were so long and firmly associated not only in the life of the individual but phyletically. Thus the manifestations of fear in us today are of prehistoric and prehuman origin. Compared to the age of his stock or stem, man is just born, and while he has evolved certain functions of intellect since he has attained man's estate, his far more basal feelings are archaic and have developed no new organs. Primitive man and his ancestors too had great vitality, and even today savages survive severe operations almost incredibly. This fact is of profound significance for understanding the genealogy of fear, for if our predecessors had died of every slight trauma or injury, they would not have transmitted its lessons of wisdom and caution, so that their posterity would not have known how to fear aright, and both heredity and tradition would have had less value in making them do so. Again, a skunk, a venomous serpent, a turtle or an armadillo, the self-preservation of which is due but in a slight degree to its strength, agility or wisdom, would naturally develop but little temibility. Emotions now touch very lightly the same keys which once, pressed hard, played the loudest and most barbaric antiphone of behavior to experience in all the history of life.

Finally now, with all this complex and varied mechanism of fear so well developed, as it had been originally by the emotion itself, fear that is prevented from using its own organs is often exhaustive to the point of danger. Caged animals, terrified, but unable to fight or fly, show more depleted brain cells than those that can react normally, so that some have thought that emotion was inversely as motion, from which it sprang. To have the blood flushed with secretions from the thyroids, adrenals and liver, to have it charged with oxygen and at the highest pressure, the heart throbbing, respiration rapid, and yet to be able to do nothing definite, may be perilous, and at any rate is wearing like running the machinery of an auto with the throttle thrust forward, and, as Crile, in his excellent article (Proc. of the Amer. Philos. Soc., 1912, pp. 76-90), well suggests, to teach a patient the danger of this state of fear and thus to check it, is now entirely feasible. Still it should not be forgotten that such inhibitions are the prerequisites of all processes of sublimation and that if we had always feared convulsively we never should have come to fear rationally. The former, though dangerous to the weak, is an opportunity for the strong. Indeed at bottom

the tension of fear that does not at once find vent with abandon in outgrown brutish ways, is the same tension which originally made these old low-level functions. Repression is the first call to go higher and find or make a better mode of expression. If man had always continued to exhaust himself, dancing out his savage fears of epilepsy, pestilences, spectres, etc., he would never have found more scientific modes of allaying these fears. The great and strong must fear greatly and strongly but refrain from the more instinctive forms of expression, for from this long-circuiting upward have sprung most of the epochful emancipations of man's estate from its long oppression by fears.

I cannot find in the literature on *pavor nocturnus,* covering hundreds of cases, a single study of the subject (especially from the ideopathic side) that begins to be up to the methods of modern scientific psychology. Like, to some extent, fear, in general, *pavor* lacks the keen analysis and observation which Jackson gave to epilepsy and Freud to sex. Very few clinicians, and much less physicians have ever seen or even studied with anything like the resources now available many or probably some of them any actual cases, but their records are mostly made up of observations of nurses, parents, attendants, etc. The somatic trend of modern medicine, added to the doctor's solicitude to relieve and cure, have prevented the effort to get from children at the critical moment of awakening such light as they might be able to shed upon the imagery or deliria or other psychic content of the seizure. A single case, long and intensively studied, with all the resources now available, would be worth scores of the accounts or compilations printed in medical journals and would mark a new epoch in the subject. It would contribute something of value to confirm and develop, or conversely to correct or refute the views I have ventured to express above. Some thirty years ago Helmholtz told physicians in an elaborate address that they could not and would not think. Since then medical science has developed by leaps and bounds but almost entirely on the physiological, chemical and bacteriological basis. In the field of mental medicine physicians are still not only as unable or unwilling to think as Helmholtz charged, but they do not think it necessary to think. A symptom group is best explained by finding or conjecturing some center, while in fact the more psychic a phenomenon is the less likely it is to have any sharp localization. Then comes the professional horror of anything that seems to favor mind-curism. In the field of

pavor nocturnus in particular, there is very little literature that surveys the entire subject or field or attempts any synthesis. It is an eternal discussion of definition, nomenclature, organic or functional disorder, which is assumed to be at the basis of everything, while all psychotic phenomena fall in the blind spot of the medical eye because these topics are very rarely taught in medical schools.